The Response of the Czech Gas Association to the European Commission's public consultation on Energy System Integration

The Czech Gas Association is an independent association of organizations and experts operating in the gas and related industries and was founded in 1919. The Czech Gas Association is as well a founding member of the International Gas Union as a founding member of the Natural and bioGas Vehicles Association.

On behalf of our members the Czech Gas Association welcomes the EC´s public consultation on energy system integration as it will be one of the key enablers of successful reaching of our join 2030 and 2050 targets. Hereby, we would like to share our feedback and remarks on the questions raised by the EC experts in the consultation.

Before addressing individual questions, we would like to make several general remarks. First, we would like to highlight, that when analysing energy system integration, we always have to take holistic approach and besides electricity sector, we have to focus equally on heating and cooling (decentralised as well as municipal central heating and cooling systems), transport and energy use in industry. Otherwise, proposed solutions might be oversimplified and not meeting all the needs of the complex energy systems and needed energy carriers.

Second, economic costs and technical challenges associated with meeting our climate-energy objectives will be enormous and that is why the whole process and path to reaching energy transition objective must be very well balanced and well-thought through and taking due account of all the tools we have available in the short term, medium term and long term and maximising positive effects they can deliver. Representing the gas sector, we would like to stress imminent economic and environmental benefits, that coal - or oil- to gas switch can bring in heating and cooling or transport sector (usage of CNG/LNG). Here, all the technologies are already well proven and economically viable with robust and well-functioning infrastructure and their implementation using conventional natural gas in the short to medium term will generate substantial savings in CO_2 and particulates emissions while providing stabilizing effects on electricity systems with rising shares of intermittent renewable electricity without substantial negative effects on competitiveness of European industry and households expenditures. For minimising overall economic costs of energy transition it is vital not to prematurely eliminate natural gas based solutions in the sake of ultimate zero-carbon future solutions while these are still not commercially or technically fully available as half a loaf is better than no bread at all.

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Third, following the upper mentioned remark, EU climate and energy policy should focus not only on the end solution and prefered technologies in 2050 horizon, but it should present a credible short to medium term trajectory based on technologically neutral usage of available technologies and nondiscriminatory support of immature technologies. We should avoid ultimate winner or loser-picking and provide all potential solution fair chance of success.

1) **What would be the main features of a truly integrated energy system to enable a climate neutral future? Where do you see benefits or synergies? Where do you see the biggest energy efficiency and cost-efficiency potential through system integration?**

Transition to a climate neutrality will create enormous challenges as it will require generating vast amounts of renewables, storing large energy volumes over weeks, months and seasons, and transporting energy from renewables from where it can be most efficiently and feasibly produced to where it is consumed.

In order to minimise potential negative impacts on European competitiveness and with the aim to further strengthen European industry and its relative global competitiveness, decreasing emissions from economy must be made with maximum cost-effectivity and pragmatism, maximising all the synergic effects, that we can, and therefore coal/oil-to-gas switch and gradual greening and decarbonising of the gas sector should have a maximum priority.

Well interconnected, flexible, and resilient EU gas transmission and distribution system, large-scale gas storages and LNG terminals have lots to offer to overcome these challenges. Gas infrastructure on European as well as on many national levels is well developed and robust which opens possibilities for synergies between electricity and gas sectors that would at the end bring needed flexibility to the whole energy system.

Moreover, as highlighted in the Communication from the Commission on the European Green Deal[1], one of the most important aims of the Smart Sector Integration initiative must be, at the end of the day, to achieve decarbonisation at the lowest possible cost. Sector coupling facilitates the cost-optimal development towards decarbonisation in comparison with scenario where energy infrastructure is solely electric. According to Frontier study[2], eight countries

[1] Communication from the Commission on the European Green Deal, available at: https://eur-lex.europa.eu/resource.html?uri=cellar:b828d165-1c22-11ea-8c1f01aa75ed71a1.0002.02/DOC_1&format=PDF

[2] The Value of Gas Infrastructure in a Climate-Neutral Europe, available at: http://www.frontier-economics.com/media/3113/value-of-gas-infrastructure-report.pdf

analyzed[3] can save from EUR 487 billion to 802 billion until 2050 through the continued use of gas networks.

Above mentioned integration of gas and electricity systems (e.g. via Power to Gas technology) can alleviate local/regional infrastructure congestion in electricity infrastructure and can contribute towards the avoidance of the curtailment of otherwise non-dispatchable renewable electricity (solar and wind), i.e. contribute to solving challenges in relation to operating the power grid. This would enable the greater penetration of renewable electricity and allow large quantities of energy to be stored for long periods of time by using the flexibility of the gas system (thus also contributing towards security of supply), while providing a renewable and decarbonised/low-carbon direction to the energy system. At the same time, gas infrastructure is more acceptable to public (vs. high-voltage electricity lines).

Relying on electrification as the basis of the future energy system would mean dependence on one infrastructure. To do so would require electricity to fulfil the role which gas has held for decades: handle peak demand, store energy for months and provide dispatchable generation.

Therefore, the Czech Gas Association believes that the future EU energy system should build on a Hybrid Energy System – an interlinkage between the gas and electricity systems based on synergies between these two international energy carriers.

At the same time we should bear in mind basic principles of energy policy which are to balance cost effective, environmental and security of supply dimensions to maximise system resilience.

2) What are the main barriers to energy system integration that would require to be addressed in your view?

- Limited physical inter-connection between gas and electricity sectors. There must be a sufficient physical interconnection between both sectors so that sector integration can function properly. This interconnection might be enhanced by power-to-gas facilities or by gas power plants (either new ones or originally coal-fired ones).
- Insufficient EU and national legislative (regulatory) frameworks to enable sector coupling.
- Power-to-gas technology, as a crucial technology for sector soupling, is not yet mature enough to be operated on a necessary scale and commercial level. Thus, a regulatory sandbox regime should be introduced, including temporary exemptions to operate Power-to-gas facilities by regulated entities, to enable development of this technology until there is a sufficient market interest and a legislative framework implemented.

[3] Belgium, the Czech Republic, Germany, Denmark, France, the Netherlands, Sweden and Switzerland

- Missing incentives as the power-to-gas technology is immature and financial support would be needed to have a positive NPV for investments into renewable gases assets.
- Disproportionate taxes and levies on power-to-gas (possible double charges and levies) as such facilities are still perceived as final energy consumer instead of energy storage facility as a coupling enabling technology
- Current separate future development of electricity and gas systems. It is necessary, on the contrary, to plan the infrastructure development in both sectors collectively to achieve the most efficient utilization of the already existing energy infrastructure. TYNDPs might be a first suitable tool.
- Unidirectional politically taken decisions of future energy system vision which will ignore natural potential of the most cost-effective solutions for sector coupling (e.g. ignoring technological neutrality to achieving joint climate goals).

3) More specifically:

How could electricity drive increased decarbonisation in other sectors? In which other sectors do you see a key role for electricity use? What role should electrification play in the integrated energy system?

The electric system allows the production of large quantities of renewable energy, but it has limitations to provide long term electric storage. Also, the electric system is a fast, real time system and as such, but it is featured with limited long-term (seasonal) flexibility.

Moreover, we should bear in mind that increased decarbonisation not only in the energy sector but as well in other sectors driven by the electricity, should be provided by the electricity produced from renewables. The climate conditions in Member States are not the same and do not allow respective Members States to be full RES electric. The right to choose the most appropriate energy mix on national level should be fully respected.

We should constantly take into account heat generation for end consumers and especially households. Especially centralised municipal heating systems currently serving huge blocks of flats in some EU Member States do not have in many occasions any other viable alternative solutions as switching from coal to gas (biomass is not always available and in sufficient quantities, energy usage of waste as well). In these cases, massive electrification would be too demanding on robustness and local balancing of electricity distribution grids and the overall end-consumer prices of heat would be too burdensome for these, in general lower-income families. At the same time, switching to gas as a fuel (that will gradually become more renewable and decarbonized) will bring immediate environmental benefits and will enable preservation of these centralised heating systems that are vital to energy system stability via serving as a valued source of ancillary services (positive regulatory energy and for future

negative regulatory energy via power-to-heat technologies) and providing very viable black-start services.

What role should renewable gases play in the integrated energy system?

Gas systems are able to store large quantities of renewable energy for a long term that might not be directly used (and stored) in the electricity sector. This will provide needed flexibility to the electric system also in long run. Moreover renewable and decarbonized gases will gradually increase its share on total gas consumption in the EU and change its role from supporting element of the electricity sector to become a part of the European gas supply baseload.

In this context, it is extremely important to highlight the role of biomethane for greening of gas and sector integration. Its huge value added is, that it is from a technological point of view a well-mastered technology that could be immediately incorporated into the gas system without having any adverse effect on individual parts of gas infrastructure or end-usage appliances. On the same time, advanced biomethane combined with natural gas in its compressed or liquefied form is currently the only solution we have ready at our disposal that could help us meet very strict emission and RES targets in transport sector. Moreover, the production of biomethane is much more energy effective than to produce electricity from biogas.

When it comes to hydrogen, we would like to highlight, that its gradual penetration into the gas system should be linked to the results of compatibility checks with individual parts of the existing gas infrastructure and end-consumer appliances, as their sensitivity to hydrogen-additions into natural gas varies substantially and for some higher shares of hydrogen would currently be unbearable.

What measures should be taken to promote decarbonised gases?

Smart Sector Integration should be focused on establishing a mechanism whereby all sources and energy carriers are able to compete with each other on a level playing field, taking into account all of their externalities (notably GHG content, but equally issues such as NO_x and particulate matters). All costs and charges should be, therefore, allocated appropriately to achieve an efficient energy system and to avoid market distortion.

Electricity grid charges have a substantial impact on the overall cost and profitability of power-to-gas plants. By using energy conversion services and the underlying gas infrastructure, additional investments in the electricity grid are avoided. The benefits provided by the gas infrastructure and the power-to-gas installations to the future energy system need to be reflected in the regulatory framework. There could be appropriate incentives applied to electricity exit tariffs and gas entry tariffs to promote sector coupling and hydrogen production.

One of the potential options to accelerate greening of gas and decreasing its carbon footprint may also be setting of well-calculated and justified EU-level consumption-based target for renewable and decarbonised gases. In such a case individual Member States should have sufficient flexibility on how to implement such a target and they should be able to define the level of their contribution towards such a target by themselves. If implemented, it should be coordinated at EU level through the Governance Regulation and set out in NECPs. Here, again, we want to highlight the difference between biomethane and hydrogen when it comes to imminent readiness of the existing gas infrastructure to absorb and safely and economically transport them to all end consumers.

Yet, for the gas system to be ready to cope with the increasing shares of renewable and decarbonised gases, investments into the grid adjustment and repurposing are inevitable. It is therefore crucial that the future investment framework enables sufficient amount of public and private capital to be channeled into the gas systems in a nondiscriminatory manner.

Other measures:

- The possibility to apply for European investment funding and fast-track development, for example through the TEN-E regulation, would be particularly important.
- Establish a clear classification (terminology) and recognition of renewable and decarbonised/ low-carbon gases.
- A suitable design of Guarantees of Origin for renewable, decarbonised and low carbon gases (cross-energy carrier from electricity to gas and cross-border to get a pan European market).
- Current legislation provides limited incentive to use advanced fuels. Unlike biofuels, the use of green/blue hydrogen in fuel refineries has not yet been accepted as an emission reduction measure. The EU ETS System allows industry to use biomass to reduce emissions, however the use of blue/green hydrogen or biogas/biomethane is not yet recognized as a mitigation measure to fight carbon-emissions. If producers of gaseous fuels of non-biological origin, such as hydrogen, are able to prove the usage of 100 % renewable electricity via guarantees of origin or power purchase agreements, the product should be allowed to count fully towards the respective targets, e.g. in the transport sector.

What role should hydrogen play and how its development and deployment could be supported by the EU?

Renewable and decarbonized gases such as hydrogen will play an important role in achieving the EU's climate targets. Therefore, to enable the roll-out of H_2 production facilities (e.g. power-to-gas), a review and amendments of legal and regulatory framework is needed.

Today, however, there is no business case to invest in renewable and decarbonised gas production at scale, without some form of government/regulatory support. Investments into renewable/decarbonized gas assets would be needed to kick-start smart sector integration between gas and electricity. Whereas it is clear that renewable and decarbonised gases will need to make up a significant part of the EU's long-term energy needs, hydrogen-based technologies are not yet profitable for project promoters. The right incentives in relation to costs and value need to be enabled. The challenge today is not that the individual technologies are not proven and ready, but that they need to be massively scaled-up in order to offer cost-effective climate benefits.

Pilot project phase: A regulatory sandbox framework approach would promote innovation, system adaptation and optimisation for technologies that are at an early stage of development. This can play an important role in encouraging R&D and pilot projects by TSO/DSO/SSOs, among others. Such an approach can provide a boost to test and roll-out the required new technologies, prove their benefits in practice, and evaluate their contribution to the energy decarbonisation pathways to reward this contribution. It would allow R&D activities to be handled under more flexible terms regarding general rules such as state aid, funding access criteria, cost socialisation via regulated assets and based on specific regulatory oversight.

Scaling-up phase: Where there is currently limited commercial development of a technology, such as Power to Gas, gas TSO/DSO/SSOs should be allowed to invest in a regulated way, still complying with the unbundling rules. A regulated business allows for a low-risk and cost-efficient development of the relevant economic activities and energy transition facilities, creating new services open to all market participants in a non-discriminatory way, being under NRAs oversight.

Mature phase: Once the new sector is sufficiently developed/profitable and the risk/reward is well established, there should be the opportunity for regulation to be reduced to a minimum, allowing for a competitive market to develop via a smooth transition to fully commercial operations.

How could circular economy and the use of waste heat and other waste resources play a greater role in the integrated energy system? What concrete actions would you suggest to achieve this?

In order to support circular economy, we should minimise the landfill as soon as possible to the maximum extent possible. Collection, separation and pre-processing facilities for communal biodegradable waste should be supported, in order to pre-process the feedstock for biomethane stations and make the whole process cheaper. Final produced advanced

biomethane can serve in its compressed or liquified form as a fuel for example for municipal busses, taxis, garbage trucks etc. or it can be purely injected into the gas distribution grid and used wherever needed.

How can energy markets contribute to a more integrated energy system?

Decarbonisation of the gas sector will require the gas market design to evolve to ensure the deployment of all promising technologies in the EU in a coordinated manner, taking Member States' specifications into account. It will be essential to ensure that the decarbonisation process does not take place in a manner that undermines or even abandons all the benefits that the internal energy market has delivered.

Irrespective of the chosen pathway (hydrogen, blends or (bio)methane), the Czech Gas Association stresses the importance of keeping one European gas market. A single EU progressively renewable and decarbonised gas market would promote competition and affordability, liquidity, transparency, and security of supply across EU to keep the benefits to the end-users in comparison to fragmented markets from geographical point of view or a separate hydrogen market.

How can cost-efficient use and development of energy infrastructure and digitalisation enable an integration of the energy system?

Members of the Czech Gas Association stand ready to adapt the gas system in the Czech Republic in order to transport and store renewable, decarbonised and low carbon gases such as biomethane, hydrogen produced from (renewable) electricity or from natural gas associated with Carbon Capture Utilisation or Storage, or other means (methane pyrolysis). Czech TSO/DSO/SSOs are also assessing the readiness of the existing infrastructure to accommodate blends of hydrogen and natural gas. Indeed, since building parallel network structures would not be cost-efficient, it makes sense to use the existing natural gas networks (or repurposing them where appropriate).

The existing gas market design and network provides a robust framework to develop this blending pathway until larger scale production and large-scale dedicated demand for renewable and decarbonised/ low-carbon gases is a reality and the development of fully-fledged dedicated infrastructure is necessary.

European TSO/DSO/SSOs will accommodate the diversity of technological choices while ensuring that the achievements and overall benefits for the EU economy of the internal energy market are not diminished. Besides their expertise in gas transmission, TSO/DSOs are already experienced and best placed to provide technical services to face the upcoming challenges

such as dealing with gas quality management (of different types of gases), conversion (e.g. from methane to hydrogen) and interoperability of different gases, with the view to preserve and facilitate cross border trade in a single market.

This will require new services to be offered by gas TSO/DSOs to network users to ensure that even if gas quality differs (for example if Member States have different gas/H_2 blends), it can still be freely traded, ensuring that the internal market continues to function.

4) Are there any best practices or concrete projects for an integrated energy system you would like to highlight?

Several real-life best practices are already implemented as outcomes of natural economic efficiency of business operation. Specific technologies to highlight could be expansion gas turbines (ETG I, ETG II) used at regulation stations between gTSO and gDSO grids, where energy stored in a form of a high pressure in gTSO grid is reduced to gDSO grid pressure via expansion gas turbines which in the reduction process generate electricity and heat. Other example of possible real-life sector coupling in gas sector operation is use of excessive (waste) heat generated by work of compressor stations as a source of local heating. Last example of the best practice could be shared from electricity sector where ripple control (HDO – hromadné dálkové ovládání) is used as a tool of demand-side-response on level of distribution grid, where eDSOs are given ability to remotely control heating boilers in which electricity is consumed / stored in a form of heat used for final use by consumers.

5) What policy actions and legislative measures could the Commission take to foster an integration of the energy system?

As already mentioned above, the future integrated energy market should be based on the coupling of electricity and gas sectors and on the future development of renewable gases as these will play a key role in that system. However, promotion of renewable gases is difficult without incentives.

The current legislative and regulatory frameworks were developed prior to the deployment of first power-to-x facilities, therefore not considering its potential and possibilities. The current market conditions are not supportive for growth of power-to-gas operation. In addition, under current market conditions, power-to-gas does not offer viable commercial business cases. Therefore, to enable the roll-out of power-to-gas facilities, a review and amendments of legal and regulatory framework is needed to ensure a sufficient development of power-to-gas infrastructure.

Other:

- Establish stable and clear legislative and regulatory framework of the power-to-gas facilities.
- Ensure a level playing field for investments into technologies that support transition to low-carbon economy in accordance with the principle of technological neutrality, i. e. not only expansion of electricity grids (with the goal of electrification) but also to allow maximal utilization of existing gas grids.
- Gas TSO/DSO/SSOs should be allowed to invest (own and operate) in pilot projects that facilitate decarbonization of gas system and smoothen pathways for future commercialization of projects contributing to decarbonization.
- Necessary incentives and support schemes, including regulatory sandboxes to support research and development, should be encouraged at a European level.
- Renewable and decarbonised gases need to be able to cross borders and sectors. Cross sector conversion of energy should be allowed. For example, conversion of renewable electricity into renewable gas and vice versa. Any guarantee of origin or certification scheme needs to be flexible enough to allow physical transfers between Member States.
- Since power-to-gas is a technology that converts renewable electrical power to another renewable and decarbonised energy carrier, namely gas/hydrogen, it should be treated as a conversion facility which offers conversion services of energy from the electricity system to the gas system. Power-to-gas facilities should not be seen as electricity consumers nor as electricity storage facilities. Therefore, power-to-gas facility users should not be subject to taxes and levies for electricity since they are not consumers/storage facilities.
- Existing EU gas legislation should be extended to hydrogen and CO_2 networks. Non-discriminatory Third-Party Access to hydrogen networks will be essential to guarantee a level playing field between all producers (incumbents and newcomers), all users (established intensive users or developing users), and to preserve the integrity and further develop the internal European energy market.
- Regulators should recognize the cost of refurbishment and upgrading of the natural gas networks necessary for a future proof system

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